

## **TITLE : Hand-operated circular saw having blade cutting depth adjustment device**

### **BACKGROUND OF THE INVENTION**

The present invention relates to carpentry and brick 5 layer's cutting tools and more particularly to a hand-operated circular saw having blade cutting depth adjustment device which is capable of leaning on a wall, a top of table and/or the ground to precisely cut a ~~working~~ <sup>work</sup> object.

As we know that the conventional cutting machine is 10 principally of the table type having a rotatable saw blade on the top for cutting lumbars, tiles and/or stones, on which the ~~working~~ <sup>work</sup> piece ~~pieces~~ are usually pushed to the saw blade. Because the ~~working~~ <sup>work</sup> piece ~~pieces~~ may be too large or too small to fit the saw blade, it is difficult to cut on the table type cutting 15 machine. Thus a hand-operated circular saw appears in the market. This type of circular saw can be freely operated by the user because it <sup>is</sup> ~~not~~ graspable by the hand of the user. However, its rapidly rotated saw blade may unintentionally hurt people or the user himself if he works unconsciously.

20 Fig. 1 shows a prior art hand-operated circular saw which comprises a graspable main body 10, a head 11, a threaded axis operated by a motor inside the head 11, a saw blade 13 wrapped onto the axis 12 and secured by a nut 14 and a guard 15 protected a great portion of the saw blade 13. This type 25 of the hand-operated circular saw has a disadvantage that the

guard 15 could not lean on object to cut a ~~working pieces~~ <sup>work piece</sup>.

Figs. 2 and 3 show another prior art hand-operated circular saw 20 which comprises a graspable main body 21, a head 22, a threaded axis 23 operated by a motor inside the head 22, a 5 guard 26 secured to the head 22 by a plurality of screws, an inner cover 261 wrapped on the guard 26 before a saw blade 24 secured onto the axis 23, an outer cover 262 ~~wrapped~~ <sup>step wrapped</sup> to the outside of the inner cover 261 with an arcuate spring 28 disposed therebetween for providing the rotatable resilient 10 force to the outer cover 262, an outer guard 27 disposed on the top of the guard 26 having a plurality of slots 271 in the peripheral wall for adjustably ~~secured~~ <sup>securing</sup> the outer guard 27 to the guard 26 by a plurality of bolts <sup>on</sup> internally threaded ~~block~~ 272, and butterfly nuts 273 and a U-shaped handle 29 15 pivoted to the head 22 by screws <sup>274</sup>. In operation, the outer guard 27 can be adjusted to lean on a wall in accordance with the cutting depth of a ~~working~~ <sup>work</sup> piece and the covers 261 and 262 are immediately returned to their original positions right after the saw blade 24 removed from the ~~working~~ <sup>work</sup> piece 20 in order to prevent the dirt and the water from sprayed to the user. ~~Due to that~~ <sup>The</sup> adjustment of the outer guard 27 needs experience and must be tried again and again <sup>and</sup> that's inconvenient.

#### SUMMARY OF THE PRESENT INVENTION

25 The present invention has a main object to provide a

hand-operated circular saw having blade cutting depth adjustment device in which a lower plate and a lateral plate are adjustable to decide the cutting depth of the blade and to enable the circular saw to lean on a plane surface of a 5 table and/or a wall during operation.

Accordingly, the hand-operated circular saw of the present invention comprises a main body having a hand grasp portion and a head portion, a motor inside the head <sup>portion</sup> to operate a thread axis on a lateral side thereof, an upper cover secured to a 10 lateral side of the head portion, a lower plate with a guard disposed therebetween for protecting therein a circular saw blade which is secured on the threaded axis. The upper cover has at least a pair of symmetrical pivot tubes each of which has a spring, an internally thread cylinder rod connected 15 with the lower plate by screws and a quickly operated bolt inserted into the top thereof screwed within the upper portion of the cylinder rods to adjust the vertical movement of the cylinder rods. A lateral plate disposed on the front of the head portion connected at least an internally ~~threaded~~ elongate 20 cylinder rod which has its front portion slidably inserted into a positioning through hole on an upper surface of the upper plate. Therefore, the lower plate is vertically adjustable to enable the hand-operated circular saw to ~~lean~~ 25 on the plane surface of a table, a wall and/or a ground and the lateral plate is horizontally adjustable to decide the

cutting depth of the saw blade. ~~These~~ <sup>This</sup> adjustment is very easy, convenient and precise.

The present invention will become more fully understood by reference to the following detailed description thereof 5 when read in conjunction with the attached drawings.

#### BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a hand-operated circular saw according to a prior art,

Figure 2 and 3 are the exploded perspective view ~~and~~ <sup>and</sup> 10 sectional view of a hand-operated circular saw according ~~to~~ <sup>to</sup> another prior art,

Figure 4 is a perspective view of a hand-operated circular saw of the preferred embodiment according to the present invention,

15 Figure 5 is an exploded perspective view of Fig. 4, Figure 6 is an exploded perspective view of Fig. 4, ~~looking~~ <sup>looking</sup> from a different angle,

Figure 7 is a sectional view of a positioning through hole and ~~an~~ <sup>an</sup> elongate rod inside the through hole,

20 Figure 8 is a perspective view and partially sectional view to show the details of a pivot tube,

Figure 9 is a plane view indicating the vertical movement of a lower plate actuated by a quickly operated bolt,

25 Figure 10 is a plane view indicating the horizontal movement of a lateral plate,

Figure 11 is a plane view indicating that the lateral plate is already at a desired position, and

Figure 12 is a plane view indicating that an oblique portion of the lateral plate leans on a plane surface of a wall.

## 5 DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference to the drawings and initiated from Figs. 4, 5 and 6, the hand-operated circular saw having blade cutting depth adjustment device of the present invention comprises a hollow interior tubular body 30 having a hand grasp portion 31, a head portion 32 which includes a threaded axis 321 extruded out from one lateral side operated by a motor (not shown) embedded therein and a plurality of screw holes 322 spacedly formed in the head portion 32 around a circular protrusion for securing an upper plate 33 by a plurality of screws 323, which has a protrudent circular hole 330 in a plane portion engaged on the circular protrusion <sup>321</sup> a pair of pivotal tubes 331 spacedly projected upward for respectively receiving a pair of springs 351, a pair of internally threaded cylinder rods 352 for engaging with a pair of quickly operated bolts 353 in the top and connected with a lower plate 35 in the bottom by a pair of screws 354 through a pair of through holes 358 in the lower plate 35, a pair of horizontal arc protrusions 334 spacedly formed on the top of the upper plate 33 each including a central bore 335 for slidably engaging within a pair of internally threaded elongate cylinder rods

337 which are locked by a pair of butterfly bolts 338 through a pair of tilting screw holes 336 (as shown in Fig. 7) and connected at their outer ends with a lateral plate 34 by screws 339 through a pair of through holes 341, wherein the 5 lateral plate 34 has a straight portion 342 and ~~an~~ oblique portion 343 each of the portions 342 and 343 including a pair of parallel slits, the pivotal ~~the~~ tubes 331 having graduations 3311 on their outer periphery and the lower plate 35 having a pair of projections 355 spacedly projected upward 10 from upper surface each including a flat top 356 engaged with the graduations 3311 of the pivotal tubes 331, an internally threaded tube 36 engaged with the thread axis 321, a guard plate 37 having an internally threaded central bore engaged with the externally threaded lower portion of the circular 15 hole 330 of the upper plate 33, a circular saw blade 38 secured to the threaded axis 321 with a pad ring 371 engaged therebetween and secured by a disk 372 which has ~~an~~ internally threaded protrudent central bore engaged with the distal portion of the threaded axis 321, and a roughly U-shaped 20 handle 39 pivoted to the head portion 32 by a pair of screws 391 with a pair of washers engaged therebetween. Thereby, the hand-operated circular saw is portable.

Referring to Figs. 8 and 9, in operation, put the lower plate 35 on a plane surface of a ~~working~~ <sup>work</sup> table or a wall and 25 turn about the quickly operated bolts 353 to adjust the

vertical position of the lower plate 35 referring to the graduations 3311 on the pivotal tubes 331 and the vertical position of ~~the~~ saw blade 38 is simultaneously adjusted so that the user needs not to try again and again. The springs 351 in the pivotal tubes 331 provide the proper counteraction force to enable the quickly operated bolts <sup>353</sup> ~~357~~ a stable engagement in the pivotal tubes 331 without loosening.

Referring to Figs. 10 and 11, when loosens the butterfly bolts 338 to allow the internally threaded elongate cylinder rods 337 free to slide within the central bore 335 of the horizontal ~~are~~ <sup>arc</sup> protrusions 334, the lateral plate 34 is horizontally adjustable to find a desired position relative to the saw blade 38 which is <sup>a</sup> protruded of ~~the slit of the~~ <sup>through hole 341</sup> ~~face~~ lateral plate 34. Then fastens the butterfly bolts 338 again.

When cutting a ~~working~~ <sup>work</sup> piece, the straight portion 342 of the lateral plate 34 may contact ~~to~~ the upper surface of the ~~working~~ <sup>work</sup> piece or the oblique portion 343 leans on a table or a wall to ~~from~~ <sup>form</sup> a slant angle between the tubular body 30 and the wall to conduct a proper cutting manner. The guard plate 37 which is movably pivoted to the upper plate 33 can be turned <sup>to</sup> an angle to prevent the dirt and the water from sprayed to the user. Farther, if the lower plate 35 may lean on the wall where the lateral plate 34 contacts the ground, the cutting action can be also performed. Actually, both the lower plate 35 and the lateral plate 34 are functioned as

the rulers to be complied with during the cutting period and the cutting results must be accurate.

Fig. 12 shows that the hand-operated circular saw of the present invention may be operated without the lateral plate  
5 34.

Note that the specification relating to the above embodiment should be construed as an exemplary rather than as a limitative of the present invention, with many variations and modifications being readily attainable by a person of  
10 average skill in the art without departing from the spirit or scope thereof as defined by the appended claims and their legal equivalents.

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ABSTRACT:

A hand-operated circular saw having blade cutting ~~depth~~ ~~depth~~  
adjustment device includes a ~~hollow~~ interior tubular body having a hand grasp portion, a head portion, a motor disposed  
5 in the head portion to operate a threaded axis protrude from a threaded circular protrusion on ~~an~~ outer side ~~of~~ ~~portion~~ ~~of~~ ~~the~~ head, an upper plate secured to the outer side including a circular hole engaged with the circular ~~protrusion~~, a pair of pivotal tubes and a pair of horizontal arc ~~protrusion~~ ~~protrusion~~ on the top, 10 a guard plate, a pad ring, an internally thread tube and a saw blade sequentially secured to the axis, a lower plate connected to a pair of cylinder rods inside the pivotal ~~tube~~ ~~tube~~ ~~bolt~~ a pair of quickly operated ~~bolt~~ in the top of the pivotal tubes for adjusting the vertical positions of the lower plate and 15 the saw blade ~~and a cutting depth adjustment device~~ ~~a bent lateral slidably engaged within the horizontal arc protrusion through a pair of elongate cylinder rod for adjusting the cutting depth of the saw blade and a U-shaped handle pivoted to the head portion of the tubular body~~.